

The remaining letters, of which there are eight, consist of two things—on the one hand of discussion of the results of the hawksweed experiments and of appeals for rare or unobtainable species of that genus, and on the other of personal and friendly communications. The former are interesting only to the specialist, and to him even the interest is chiefly historical, since Mendel did his crossings without the knowledge which we now possess, that the hawksweed sometimes exhibits parthenogenetic reproduction.

At the beginning of the third letter we get a glimpse of Mendel. He is giving his reason for not having studied the hawksweeds in their natural habitat in the neighbourhood of Brünn, and proceeds: ". . . auch taue ich mich nicht mehr recht für botanische Excursionen, da mich der Himmel mit einem Uebergewichte gesegnet hat, welches sich bei weiteren Fusspartien, namentlich aber beim Bergsteigen, in Folge der allgemeinen Gravitation, sehr fühlbar macht."

Later, in the same letter, we read of him nearly ruining his eyesight by the extremely difficult operation of castrating *Hieracium*, and we can picture him, with bent head close to flower, absorbed in his beloved experiments. That Mendel did this work because he loved it, and not for the hope of any reputation he might gain by it, is abundantly evident. The impatience with which he waited for the blossoming of certain hybrids finds eloquent expression in the last words of the third letter. And Prof. Correns remarks in his introduction: "Die Briefe zeigen, dass das was Mendel veröffentlicht hat, in der Tat in gar keinem Verhältnis steht zu dem, was er gearbeitet hat." The reason that he published so little lies also in the fact that in '68 a great change took place in his circumstances, which robbed him of his time. ". . . Meine Wenigkeit wurde nämlich am 30 März von dem Kapitel des Stiftes, dessen Mitglied ich bin, zum lebenslänglichen Vorstände gewählt."

That Nägeli entertained a high opinion of Mendel is shown by the trouble that he took to obtain the plants which Mendel wanted; and that, as a result of this correspondence, Nägeli grew not only to esteem him as a man of science, but to value him as a friend, is shown by the fact that in the first five letters he addresses Mendel as *Verehrtester Herr College*, but that in the last five he calls him *Hochgeehrter Herr und Freund*. And that, I think, sums up one's feelings when one reads these letters. At the beginning, we feel, Mendel stands to us in the relation of a *College* only; at the end we feel that he is both our *College und Freund*. Is there not something that attracts us in passages like the following, from the end of the seventh letter? "We have been rejoicing here for weeks past in the most glorious spring weather. Compared with the yearly average, the vegetation is thirteen days in advance, and everything is in leaf." A. D. D.

NOTES.

THE pupils of M. Moissan are taking the opportunity presented by the twentieth anniversary of the isolation of fluorine to offer their distinguished master a medal in commemoration of this important event in the history of chemistry. The execution of the medal has been entrusted to M. Chaplain. The promoters of this happily-conceived scheme have decided to extend to men of science generally an invitation to contribute to the expenses. Every subscriber of 25 francs will receive a replica in bronze of the medal. Donations may be sent, up to November 30, to the treasurer to the committee of management, M. P.

Masson, 120 boulevard Saint-Germain, Paris. Fuller particulars may be obtained from the secretary of the committee, Dr. Guichard, 3 rue Michelet, Paris.

PROF. T. H. MIDDLETON, professor of agriculture in the University of Cambridge, has been appointed assistant secretary to the Board of Agriculture and Fisheries, in succession to Dr. W. Somerville.

THE death of Mr. William Sedgwick, a member of the medical profession who combined the active duties of his calling with the pursuit of scientific investigation, is announced in Wednesday's *Times*. Mr. Sedgwick was born in 1821, and during the 'sixties of last century he devoted much attention to the study of heredity, and published articles upon the subject which were referred to and quoted by Darwin. Soon after his establishment in Marylebone as a general practitioner, London was visited by the great cholera epidemic of 1854; and Mr. Sedgwick devoted much attention to the chemical changes incidental to the disease, and made them, in 1889, the subject of his presidential address to the Harveian Society.

THE death is announced in St. Petersburg, on October 19, of Prof. T. T. Beilstein, the well-known Russian chemist. His numerous researches in organic and analytical chemistry, and especially his work on the aromatic series, enriched science with many new discoveries, and gave a new direction to chemical industry. He also made extensive researches on Caucasian naphtha and coal-tar. His works, written in German, were very numerous, the chief of them being his "Handbuch der organischen Chemie" and his text-book on analytical chemistry. Prof. Beilstein was born in St. Petersburg on February 5, 1838. He studied chemistry under Prof. Bunsen at Heidelberg, and also attended the lectures of Liebig at Munich. He studied physics under Prof. Jolly, and at the age of eighteen published his first work on the diffusion of liquids. At Göttingen he obtained the degree of Doctor of Philosophy. In 1859 he became assistant professor of chemistry at the Breslau University, and in 1866 was appointed professor of chemistry at the St. Petersburg Technological Institute, where he remained the rest of his life. He also lectured at the St. Petersburg Military Academy, and was made an academicien of the St. Petersburg Academy of Sciences in 1886.

THE proposed new scheme for the mathematical tripos will be voted upon at Cambridge this afternoon. In a letter to the *Times* of October 22, the professors of mathematics and of the cognate subjects of physics and engineering, and all the other official teachers of mathematics in the University, state the chief grounds upon which they are in favour of the proposed changes. The traditional system of placing the names in the mathematical tripos list in order of merit is shown to be unsatisfactory, and to involve the sacrifice of the educational interests of many students. The number of men who wish to devote their whole course at Cambridge to the study of mathematics is much smaller than twenty years ago. At the present time, however, there are a considerable and increasing number of students of engineering and of physics who require mathematics up to a fairly high level, but do not come into contact with the mathematical school proper. To provide for the needs of the important class of men who ought to spend part, but not the whole, of their time at Cambridge in studying mathematics is one of the chief objects aimed at in the proposed new scheme. It will be for the advantage of the special mathematical students,

as well as of those who learn mathematics with a view to its application in physics or in applied science, that the teaching of the subject be unified. The two classes of students may thus avoid the opposite dangers of taking a too purely abstract view of the science on the one hand, and of regarding it as consisting of a set of empirical rules on the other. The letter is signed:—Robert S. Ball, Lowndean professor of astronomy and geometry; G. H. Darwin, Plumian professor of astronomy; A. R. Forsyth, Sadlerian professor of pure mathematics; B. Hopkinson, professor of mechanism and applied mechanics; J. Larmor, Lucasian professor of mathematics; J. J. Thomson, Cavendish professor of experimental physics; H. F. Baker, Cayley lecturer in mathematics; E. W. Hobson, Stokes lecturer in mathematics; and R. A. Herman, J. G. Leatham, H. W. Richmond, university lecturers in mathematics.

DR. WILLIAM OSLER, regius professor of medicine at Oxford, delivered the Harveian oration at the Royal College of Physicians on October 18. He took as his subject "The Growth of Truth" as illustrated by the history of Harvey's discovery of the circulation of the blood. Truth, he said, grows like a living organism, and its gradual evolution may be traced from the germ to the mature product. All scientific truth is conditioned by the state of knowledge at the time of its announcement. Thus, at the beginning of the seventeenth century, the science of optics and its mechanical appliances had not made possible (so far as the human mind was concerned) the existence of blood capillaries and of blood corpuscles. Jenner could not have added to his inquiry a discourse on immunity. Sir William Perkin and the chemists made Koch possible, Pasteur gave the conditions which produced Lister, Davy and others furnished the preliminaries necessary for anæsthesia. To scientific truth alone may the *homo mensura* principle be applied, since of all the mental treasures of the race it alone compels general acquiescence. That such general acquiescence, such aspect of certainty, is not reached *per saltum*, but is of slow, often of difficult, growth, marked by failures and frailties, but crowned at last with an acceptance accorded to no other product of mental activity, is illustrated by every important discovery from Copernicus to Darwin. The growth of truth corresponds to the states of knowledge described by Plato in the "Theætetus"—acquisition, latent possession, conscious possession. Scarcely a discovery can be named which does not present these phases in its evolution. In a hundred important problems acquisition has by slow stages become latent possession; and then there needs but the final touch, the crystal in the saturated solution, to give us conscious possession of the truth. When those stages are ended, there remains the final struggle for general acceptance. But however eminent a man may become in science, he is very apt to carry with him errors which were in vogue when he was young, errors that darken his understanding, and make him incapable of accepting even the most obvious truths. It is a great consolation to know that even Harvey came within the range of this law; it was the most human touch in his career.

AFTER an interval of only three weeks, another violent hurricane burst over the more western portions of the West Indies on October 17, apparently with little or no warning of its approach. As is usually the case with tropical storms, the area of the cyclonic whirl was small, for while the Cuban provinces of Havana and Pinar del Rio were devastated, Matanzas and Santiago were not affected. In the city of Havana the cyclone attained terrific

violence on the morning of October 18, structures being rocked as if by an earthquake. Many buildings were demolished, there were numerous shipping casualties, and the loss of life was considerable. The storm was accompanied by deluging rain, which soon flooded the streets and rendered vehicular traffic of all sorts impossible. Enormous waves raised by the wind dashed thirty-five lighters in pieces against the wharves. The destruction in the city is estimated at a couple of million dollars. Passing on to Florida, the hurricane wrought great havoc on its way, wrecking ships and causing great loss of life. One captain reports that he took shelter under Elliott's Key on the morning of October 18, but shortly afterwards a huge wave swept the island, and its 250 inhabitants are believed to have perished. Owing to the interruption of telegraphic communication, the full extent of the damage in Florida is not known, but at alligator-breeding Miami various places of worship, the concrete-built prison, and a hundred houses were involved in the ruin. Mixed up with the information relating to the Cuba-Florida hurricane are messages reporting immense destruction by floods in the Central American Republics. So far as can be gathered from the brief cablegrams, rain-storms, and not wind-storms, have been the cause of the damage. In San Salvador the storms are said to have been incessant during ten days, the country being flooded, and the physical features completely altered in many places. Aqueducts and iron bridges have been carried away, the railway, electric lighting, and telegraph services disorganised, there has been great loss of life, a man-of-war lost, and the losses in cattle and crops have been very heavy. The casualties in Guatemala and Honduras are estimated at many millions of dollars.

THE type of weather has been very unsettled during the past week, and exceptionally heavy rains have occurred in Scotland and in the north-east of England, while in most parts of the country rain has fallen each day. Snow has occurred at times in Scotland. In the south and south-east of England the weather has been unusually warm for the time of year; and with the single exception of October 19 the reading of the thermometer at Greenwich has exceeded 60° each day. On Monday, October 22, the Greenwich temperature was 69°, which is 3° higher than any previous record on the corresponding day since 1841, a period of sixty-five years, and on Sunday, October 21, the thermometer registered 67°·5, which is 1°·5 higher than any previous reading. The nights have also been exceptionally warm, the thermometer at times scarcely falling below 60°. Strong winds and gales have occurred over the northern and western portions of the kingdom.

ACCORDING to a paper by Dr. W. E. Hinds, forming Bulletin No. 59 of the Entomological Bureau of the U.S. Department of Agriculture, the damage done to crops by the Mexican cotton-boll weevil is in a fair way of being to a considerable extent neutralised as the result of the presence of the insect itself. Cotton-bolls (or buds), it appears, when pierced by the beak of the weevil show a decided tendency—more strongly developed in some strains than in others—to proliferation, producing internally a number of large thin-walled cells placed so close together, and so loosely combined, that the whole structure presents a granular and gelatinous texture. Amid this abnormal tissue (which is in no wise poisonous to the insects) the grubs of the weevil are hatched, and proceed to develop. A considerable percentage is, however, found to perish, and it is inferred "that the great majority of the deaths due to

proliferation may be caused by the mechanical effect of the formation in first enveloping the larva so closely as to prevent its movement, and then the continued formation producing sufficient internal pressure slowly but surely to crush to death the foe whose attack has called forth this as self-defence on the part of the plant." Proliferation may be stimulated by puncturing the cotton-buds, while strains should be selected for cultivation in which the proliferating tendency is most marked. Already the effects of proliferation in keeping the weevil in check appear to be of more importance than those due to parasites, and it is expected they will rapidly increase. Of course the weevil will endeavour to accommodate itself to the new conditions, but, since man is on its side, it is hoped that the plant will conquer.

In the latest issues of the fishery series of the publications of the Danish Commission for the Study of the Sea (Meddelelser fra Kommissionen for Havundersøgelser: Fiskeri, vol. ii., Nos. 1-3, Copenhagen, 1906), the larval and post-larval stages in the life-history of certain members of the flat-fish and cod families are described in great detail, with a wealth of illustration. The plaice, dab, and flounder form the subject of the first part, and while the features by means of which the young stages of each may be recognised are pointed out, the illustrations show the manner in which the symmetrical larva gradually changes into the unsymmetrical "flat-fish." The statement that young plaice have been found while in the early bottom-stage in deep water is shown to be due to confusion with the dab, and the special need of protection by the former on account of its shallow-water habitat is emphasised. Attention is directed to the curious circumstance that when leaving the pelagic for the bottom stage these fishes diminish in size. From the other species the dab, when it reaches the bottom-stage, is distinguished by its large eyes and narrow bodily form. In the second part the early stages of several of the more typical members (*Gadus*, &c.) of the cod-family are described and illustrated, while in the third part the species of ling (*Molva*) receive attention. All the lings are distinguished from cod by the great length of the pelvic fins in the early stages, and it is not a little remarkable that two such nearly-related species as the common and the blue ling should differ widely in regard to the development of pigment-bands on the hinder part of the body at this period of life. The blue ling in this respect occupies, indeed, a position intermediate between the common ling and the torsk (*Brosimius*).

In the fourth part of the "Plankton" series of the above-mentioned publication Mr. O. Paulsen discusses the distribution of the crustacean *Calanus finmarchicus* in Icelandic waters. This species, which forms the staple food of several kinds of fishes, breeds chiefly in the spring, when death follows propagation. There is, however, reason to believe that a certain percentage breeds at other seasons. Reproduction takes place only in the sea to the southward of Iceland, these crustaceans being carried to the west, north, and east coasts of that island by the Irminger current. As the species forms an essential element in the food of the herring, it is probable that the migrations of the shoals of the latter fish are largely influenced by the presence of swarms of the crustacean. Towards autumn the numbers of *Calanus* at the surface decrease, and as the species has then reached its second developmental stage, it is probable that it descends into deep water to pass the winter, rising again to the surface with the return of spring to undergo the final transformation.

IN the *Calcutta Medical Journal*, vol. i., No. 2, Mr. C. L. Bose is the author of an article on the toxic principles of the bitter variety of the fruit of *Luffa aegyptiaca*. The fruit is not infrequently compounded into a curry, and in consequence of a case where the effect was injurious an examination was made resulting in the extraction of two glucosides, the one resembling *colocynthin* in some of its reactions.

To accompany a collection of botanical books and portraits illustrating the history of plant classification, arranged in the botanical gallery of the Natural History Museum, South Kensington, the keeper of the department has drawn up a short guide explaining the chief features of the various exhibits. Among early works may be seen the "Materia Medica" of Dioscorides dated 1499, Brunfels's "Herbarium," Gerard's "Herbal," and Bauhin's "Prodromus." The collection also includes a copy of Linnæus's "Systema Naturæ," and volumes by de Jussieu, de Candolle, and more recent noted systematists.

THE botanical series of Memoirs of the Department of Agriculture in India is inaugurated with a volume giving an account of the early stages in the development of the haustoria of *Santalum album*, by Mr. C. A. Barber. The haustoria arise on the root of the seedling as early as the lateral rootlets, and independently of any stimulus due to contact with foreign bodies; they continue to form on the young rootlets, providing the most important absorbing organs. The chief features are the central core or nucleus, and the external clasping folds; when the haustorium comes into contact with an inorganic body, a succession of nuclei and folds may be produced. Frequently a strand of glandular cells is developed that assists in penetration.

THE number of Engler's *Botanisches Jahrbuch* issued in August, vol. xxxviii., part ii., contains a series of determinations of new African plants, forming the twenty-ninth fascicle of "Beiträge zur Flora von Afrika." The volume opens with a short list of Cyperaceæ, prepared by the late Mr. C. B. Clarke. Dr. R. Schlechter, who contributes a quota of Orchidaceæ and Burmanniaceæ, alludes to the rarity of species of the latter order; five species are now added, of which two, allied to *Thismia*, are placed under new genera, *Afrothismia* and *Oxygyne*. The Compositæ and Labiatæ are determined by Drs. M. Guerke and O. Hoffmann. The paper in the supplement on the Cornaceæ deserves attention, if only for the discussion of the aberrant genus *Garrya*. The writer, Mr. W. Wangerin, restores the order *Garryaceæ*, and places it near the *Betulaceæ* and *Salicaceæ*. Evidence is also adduced for separating the genera *Alangium*, *Nyssa*, and *Davidia* from the *Cornaceæ*.

THE new series of archæological monographs to be issued by the Bureau of American Ethnology starts with a description of the antiquities of the Jemez Plateau, a mountainous region in New Mexico lying west of the Rio Grande del Norte. This country supported at one time a numerous population, but on account of climatic changes it was abandoned some six or eight centuries ago. It abounds in the ruins of ancient settlements, which fall into two classes—cliff-dwellings, some of which are artificial, some natural, and the pueblos or many-chambered houses inhabited by several families. One of the latter contains upwards of six hundred rooms, and they were usually erected in situations capable of defence. The popular theory that the cliff-dwellings were the work of the ancestors of the present Indian tribes must now be abandoned, partly because there is no resemblance between

the art of the two races, and, secondly, the ancient people were dolichocephalic, while the existing inhabitants are brachycephalic. This older race, of whom little is as yet known, was skilled in various arts, particularly that of mortuary pottery, and the finds from their settlements include weapons and implements of stone, bone, and shell, with some rude stone images, fire and medicine stones, all of which are illustrated and described by Mr. E. L. Hewett.

THE reports of H.M. Inspectors of Mines show that the use of coal-cutting machinery in British collieries continues to increase. In 1903 there were in use 643 machines, 755 in 1904, and 946 in 1905. These 946 machines produced more than eight million tons of coal, and as the total output of Great Britain was 236 million, there is still a wide field open for the introduction of coal-cutting machines. Of the machines in use, 500 were driven by compressed air and 446 by electricity.

THE most striking paper in the *American Journal of Science* for October is that by Mr. A. L. Day and Mr. E. S. Shepherd on the lime-silica series of minerals, in which the authors give the results of a study of mineral and rock formation by direct measurement at the temperatures at which the minerals combine and separate, like the solutions of ordinary chemistry under ordinary conditions. The entire series of mixtures of lime and silica have been prepared and studied. The only serious attempt hitherto made to determine the constitution of this series of minerals is that of Boudouard (*Journal of the Iron and Steel Institute*, 1905, p. 339), but the method he used is shown to be a very inaccurate one.

THE summary report of the Geological Survey Department of Canada for 1905 (Sessional Paper, 1906, No. 26) gives a concise account of original investigations carried out in the field and at the Ottawa headquarters with the object of increasing the knowledge of the mineral wealth of Canada. The staff of the Survey numbers sixty-seven, and under the direction of Dr. Robert Bell a large number of important explorations and surveys were carried out during the year. Dr. Bell himself gives an account of the cobalt mining district on the Timiskaming and Northern Ontario Railway. Specimens of pure silver weighing from a few pounds up to twenty pounds or more have been obtained in a number of the mines. Nuggets of mixed silver and calcite, weighing upwards of 100 lb., are exhibited in some of the mining offices in the district.

THE seventy-third annual report (1905) of the Royal Cornwall Polytechnic Society contains, among other papers of scientific interest, a verbatim report of a lecture entitled "An Early Chapter in the History of Cornwall," which was delivered by Sir Norman Lockyer at Penzance in April last. Sir Norman explained that the work he has recently inaugurated, dealing with the *raison d'être* of the stone circles and other stone monuments of the county, has barely commenced; much more remains to be done, but the evidence so far obtained, that their erection depended upon the utilitarian necessity for regulating the calendar by observations of celestial timekeepers, is so remarkably conclusive that it is very desirable that many other workers should carry it on until the whole of these monuments have been considered in all their details. The results obtained in Cornwall amply confirm the similar conclusions obtained from the study of Egyptian temples, and are themselves confirmed by the latter. A number of slides showing Lady Lockyer's photographs of the prin-

cipal circles, e.g. "The Hurlers" and "The Merry Maidens," were exhibited on the screen, accompanied by maps and tables showing the wonderful similarity of purpose of sight-lines which, owing to varying local conditions, are themselves dissimilar in their directions.

We have been favoured by Mr. F. Berwerth with a reprint of an interesting paper he has contributed to *Tschermaks Mitteilungen* (vol. xxv., part iii.) on the meteorite of Kodaikanal, Palni Hills, Madura district, Madras. This meteoric iron is of special interest in that, on etching, it exhibits a crystalline mass of large octahedral iron grains between which globular masses of silicates of unusual character have separated out. The general structure of the iron is thus of a porphyritic type. The ratio between the iron mass and the silicates is approximately 10 to 1. Careful examination has shown that the silicate segregations are of two kinds, a spherulitic ground mass and glassy globules. The former consists of weinbergite, diopside, bronzite, apatite, and chromite, and the latter of a glassy magma containing suspended bronzite and chromite. The new silicate compound to which the author gives the name of weinbergerite is found by analysis to have the composition represented by the formula $\text{NaAlSiO}_4 + 3\text{FeSiO}_3$. Mr. Berwerth also sends a reprint of his paper on artificial metabolites contributed to the Vienna Academy of Sciences (*Mathem. naturw. Klasse*, vol. cxiv., part i.), in which he gives the results of experiments made with a small plate of the Toluca iron to ascertain the accuracy of his view that the great group of crystalline-granular meteoric irons are octahedral irons re-crystallised in consequence of heating in a solid condition. The plate, 5 mm. in thickness, was embedded in powdered charcoal in a graphite crucible and heated for seven hours at a temperature of about 950° C. The results obtained induce the author to propose to term the re-crystallised meteoric irons "the group of the metabolites." With the increasing knowledge of the physical characters of the artificial iron-nickel alloys, fresh light will be thrown on the various forms of iron metabolites.

A CHEAP edition (price 7s. 6d. net) of M. Vallery-Radot's "Life of Pasteur," translated from the French by Mrs. R. L. Devonshire, has been published by Messrs. A. Constable and Co. The original English edition appeared in two volumes five years ago, and was reviewed at length in *NATURE* of December 5, 1901 (vol. lxx., p. 97). As Pasteur's son-in-law, M. Radot had exceptional opportunities for preparing this biography, and his work is a faithful and fascinating history of Pasteur's scientific life and aspirations.

OUR ASTRONOMICAL COLUMN.

A NEW FORM OF PHOTOMETER.—In the attempts which from time to time have been made to photograph the solar corona without waiting for a total eclipse of the sun, the intensity of the atmospheric halo about the sun's disc has played an important part. Obviously the most suitable locality for these attempts would be where the atmospheric glare is least intense. With this in view, MM. Deslandres and Bernard have designed a photometer having for its special aim the determination of the intensity of the circum-solar light.

The apparatus consists of an equatorially-mounted telescope tube having affixed to the narrower end, which is directed towards the sun, an opaque disc which just occults the actual solar disc. At the other end of the tube the light